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The Power of Love

Hugs and Cuddles Have Long-Term Effects

How often do you hug? Do you like to sit close and hold each other's hands? Recent research shows it's good for your health. Between loving partners, between parents and children, or even between close friends, physical affection can help the brain, the heart and other body systems you might never have imagined.

For centuries, artists have examined love through poetry, painting, music and countless other arts. In the past few years, scientists supported by NIH have begun to understand the chemistry and biology of love.

At the center of how our bodies respond to love and affection is a **hormone** called oxytocin. Most of our oxytocin is made in the area of the brain called the hypothalamus. Some is released into our bloodstream, but much of its effect is thought to reside in the brain.

Oxytocin makes us feel good when we're close to family and other loved ones, including pets. It does this by acting through what scientists call the dopamine reward system. Dopamine is a brain chemical that plays a crucial part in how we perceive pleasure. Many drugs of abuse act through this system. Problems with the system can lead to serious depression and other mental illness.

Oxytocin does more than make us feel good. It lowers the levels of stress hormones in the body, reducing blood pressure, improving mood, increasing tolerance for pain and perhaps even speeding how fast wounds heal. It also seems to play an important role in our relationships. It's been linked, for example, to how much we trust others.

Dr. Kathleen C. Light of the University of North Carolina at Chapel Hill studies oxytocin in married couples and those permanently living together. She and her colleagues invite couples into the laboratory and ask them to spend at least 10 minutes holding hands and talking together about a happy memory, usually about how they met and fell in love.

"What we're trying to do in a lab situation," Light explains, "is recreate some of the experiences in real life where they felt close."

The couples then get their blood drawn and fill out a questionnaire about the quality of their relationship. When the researchers compared their responses to the levels of oxytocin in their blood, they found that people who have a more positive relationship with their partner have higher levels of oxytocin.

Light and her colleagues are now trying to understand how conflict and other factors in relationships affect a couple's oxytocin levels. The results of those studies aren't yet in.

One thing researchers can say with certainty is that physical contact affects oxytocin levels. Light says that the people who get lots of hugs and other warm contact at home tend to have the highest levels of oxytocin in the laboratory. She believes that frequent warm contact may somehow prime the oxytocin system and make it quicker to turn on whenever there's warm contact, even in a laboratory.

The same holds true for mothers and infants: they both produce higher levels of oxytocin when they

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Definition

Hormone

A molecule sent through the bloodstream to signal another part of the body to grow or react a certain way.

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www.nichd.nih.gov/publications/pubs/adv_in_parenting/index.cfm

www.nhlbi.nih.gov/health/dci/Diseases/Atherosclerosis/Atherosclerosis_WhatIs.html

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have lots of warm contact with each other. "Those women who hold their babies more at home have higher responses when they hold their baby in the lab," Light says.

Much of what we know about oxytocin has come from research in animals. Mother rats, for instance, can stimulate oxytocin in their pups by licking and grooming them. This loving care has long-term effects.

When researchers separate pups from their mothers for 10-15 minutes a day and then reunite them, many mothers are so glad to see their pups that they lick and groom them intensively. If the separation lasts for several hours, however, it can have the opposite effect; the mother won't lick and groom her pups. Some mothers just never lick and groom their pups when they come back.

Pups that are groomed a lot when they're reunited with their mothers become more comfortable exploring new environments. The ignored ones develop more anxiety disorders, produce higher levels of stress hormones and have higher blood pressure.

Research from other animals, including monkeys, confirms that the quality of care a mother gives her offspring can have long-term effects on their personality characteristics and mental health as well as physical problems like heart disease.

Animal research is also shedding light on oxytocin's role in other social bonds. Mice that lack oxytocin can't recognize other mice, even after repeated encounters. When they're given oxytocin, however, they can recognize other mice again.

Dr. C. Sue Carter, co-director of the Brain Body Center at the University of Illinois at Chicago, has been studying oxytocin in prairie voles, which form strong bonds with their mates. When the researchers block oxytocin, the voles don't form such bonds. Oxytocin is especially important for females to form bonds with their mates. In males, a related hormone called vasopressin also plays a role.

Oxytocin and vasopressin aren't miracle compounds, however. Giving these hormones to other animals—even other types of voles that don't normally form social bonds—doesn't suddenly cause them to form loving bonds. Animals must have the proper genes to respond to these hormones in the first place.

"Most of us are genetically programmed to form social bonds," Carter explains, relating the results back to people. But the ability to form close bonds, she says, is shaped by early experiences. In the end, a complex interaction of genes and experience makes some people form social bonds more easily than others.

We may not yet fully understand how love and affection develop between people—or how love affects our health—but research is giving us some guidance. Give those you love all the affection you can. It can't hurt, and it may bring a bounty of health benefits. ■

Wise Choices
Feel the Love

Love and affection can have many positive effects, both mental and physical, that have been linked to the hormone oxytocin. Much of the research in people is still preliminary, but Dr. Kathleen Light of the University of North Carolina at Chapel Hill says it certainly can't hurt to follow the advice the research suggests:

- Mothers should have as much warm contact with their infants as possible, especially during the first few weeks of life. If you can't do this, though—because of illness, a premature birth or other reason—just give all the love and affection you can.
- Mothers who've had a cesarean section may need even more warm contact time, because they haven't had the increase in oxytocin that labor produces.
- Couples that have warm contact several times a day—hugging, holding hands, sitting close, etc.—have higher oxytocin levels than those that don't.
- Some studies have shown a decrease in stress hormones with massage, for both the person getting the massage and the one giving it.
- Light thinks that anything that helps you feel a sense of support and a bond with someone—even by phone or email—may help activate your oxytocin system.

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A Pain in the Gut

Recognize and Prevent Food Poisoning

A sick feeling washes over you: nausea, stomach cramps, headache and fever. Vomiting and diarrhea may soon follow. The symptoms are familiar to anyone who's had the flu, but there may be another culprit—food that's gone bad.

Food-borne illness, or "food poisoning," usually comes from eating food tainted with bacteria or their toxins. Other types of microbes—like viruses or parasites—can also be behind food poisoning. People have long known that raw meat, poultry and eggs can harbor disease-causing microbes. But in recent years even fresh fruits and vegetables have caused headline-making outbreaks of food-borne illness.

Fortunately, most cases of food poisoning aren't life threatening. You usually recover after a few days of misery. But children, the elderly and people with weakened immune systems are at more serious risk.

Food poisoning can cause debilitating abdominal pain, nausea, headache, fatigue, vomiting, diarrhea and dehydration. Symptoms usually appear several hours to several days after eating tainted food, depending on the microbe. For example, *Salmonella* bacteria—a common source of food-borne disease—usually cause illness 12 hours to 3 days after ingestion, with symptoms lasting about 4-7 days.

Noroviruses are another major cause of food-borne illness. Found in the vomit or stool of infected people, noroviruses can live in food and on surfaces. Careful hand-washing helps prevent the spread of these highly contagious viruses.

Some microbes are especially deadly. *Listeria monocytogenes*—a bacterium found in some ready-to-eat and raw foods—has caused the majority of food-related deaths in the U.S. in recent years. *Listeria* is unusual because it can grow and multiply even at refrigerator temperatures.

E. coli bacteria have been responsible for many highly publicized outbreaks of food-borne disease caused by contaminated vegetables or undercooked hamburgers. The O157:H7 strain recently made headlines when it caused 53 people to be hospitalized in a four-state region. They'd eaten tainted lettuce at a fast-food chain. The O157:H7 strain is especially harmful to children because it can cause sudden kidney failure.

You can take an active role in fighting food poisoning. Thorough washing and proper cooking eliminates many disease-causing microbes. See the "Wise Choices" box for more tips on preventing food poisoning.

The most common way to treat food poisoning is to drink plenty of fluids. The sickness usually subsides within a few days. Contact your doctor, though, if you develop signs of severe dehydration, such as dry mouth, less urination or increased heart rate, or if you develop signs of shock, like weak or rapid pulse, clammy skin or chest pain. ■

Wise Choices
Preventing Food Poisoning

- Wash your hands with hot, soapy water before and after touching food.
- Keep kitchen items, like utensils, countertops and cutting boards, clean.
- Keep raw meat, poultry or seafood and their juices away from cooked and ready-to-eat foods.
- Never defrost food on the kitchen counter. Use the refrigerator, cold running water or a microwave oven.
- Keep cold food cold and hot food hot.
- Cook food thoroughly and at a high enough temperature to kill harmful bacteria.
- Refrigerate food within 2 hours after cooking. Set your refrigerator at 40°F or lower and your freezer at 0°F.

Statistics

- Food-borne illness affects about 76 million Americans each year. It sends about 325,000 to the hospital and kills about 5,000.
- *Salmonella* caused the most outbreaks in the last 5 years, and *Listeria monocytogenes* the most deaths.

Source: U.S. Centers for Disease Control and Prevention

www.digestive.niddk.nih.gov/ddiseases/pubs/bacteria/index.htm

www.niaid.nih.gov/publications/foodborne.htm

Health Capsules

Pre-Teen Girls at Risk for Extra Pounds

Girls in their "tween" years—the ages of 9-12—are especially vulnerable to excess weight gain and related health risks that may continue into adulthood, according to a recent study. Helping girls in this at-risk age group to eat well and keep active may prevent weight-related problems in the years to come.

Childhood obesity is a growing concern in the U.S. Since 1980, the percentage of overweight youth, ages 6-19, has more than tripled. Several studies are under way to better understand how and when childhood weight gain arises.

The latest results come from an NIH-funded study that enrolled more than 2,300 girls, ages 9-10, and followed them for more than a decade. The study showed that girls were far more likely to become overweight at 9-12 years of age than in later adolescence. Excess weight brought **cardiovascular** risks, like higher blood pressure and cholesterol levels, even in some 9-year-old girls.

The researchers also found that weight problems were likely to persist. Compared to their non-overweight counterparts, girls who were overweight during childhood were 11-30 times more likely to be obese as young adults. In addition, there were differences between African-American and Caucasian girls, with black girls 1.5 times more likely to become overweight at any given age than white girls.

This study highlights the importance of helping girls as young as 9 maintain a healthy weight. Because African-American girls were at greater risk for weight gain, the results also suggest that obesity prevention efforts need to take into account cultural differences. ■

Definition

Cardiovascular
The system of heart and vessels that circulates blood throughout the body.

wecan.nhlbi.nih.gov

Short of Breath? It May Be COPD

Chronic obstructive pulmonary disease (COPD) is a growing epidemic, affecting 1 in 4 Americans over the age of 45. A serious lung disease that often goes undiagnosed, COPD is the 4th leading cause of death and 2nd leading cause of disability in the U.S.

Although COPD has readily recognizable symptoms, about 12 million Americans may have COPD but not realize it. Proper diagnosis and treatment can enhance and prolong life. That's why NIH's National Heart, Lung, and Blood Institute is working to get the word out about COPD, especially among those who are at greatest risk for the disease.

COPD sometimes goes by other names, like emphysema or chronic bronchitis. It arises when airways in the lungs become partly blocked, making it harder to breathe. Symptoms include constant coughing that produces lots of mucus, wheezing and shortness of breath. When COPD is severe, breathing difficulties can get in the way of even the most basic activities, like doing housework, taking a walk and even bathing and getting dressed.

Smoking is the most common cause of COPD, although as many as 1 in 6 people with the disease have never smoked. If you've had long-term exposure to lung-irritating chemicals or secondhand smoke, you may also be at risk. Even without such exposure, some people may develop COPD if they've inherited certain genes.

A quick and easy test in your doctor's office can determine if you have COPD, even before symptoms become severe. The test, called spirometry, measures the amount of air you can blow out of your lungs, and how fast you can blow it. If you're at risk for COPD and have even mild symptoms, talk to your doctor about getting tested.

Several treatments—ranging from inhaled medications to physical activity—can reduce COPD symptoms. By working with your doctor, you can take steps to make breathing easier and live a longer, more active life. ■

www.learnaboutcopd.org

Featured Web Site

Mind Over Matter

teens.drugabuse.gov/mom

A series to help young people in grades 5-9 understand the effects of drug abuse on the body and brain. They can learn about the effects of specific drugs and drug groups including stimulants, hallucinogens, inhalants, marijuana, opiates, nicotine, methamphetamine and steroids.
From NIH's National Institute on Drug Abuse.